TFW 1762

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT(S)	:	Boschert et al.
TITLE	:	METHOD FOR PRODUCING A THERMAL PAPER
APPLICATION NO.	:	10/591,659
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Cleveland, OH 44114
November 13, 2006

SUBMISSION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The subject patent application was filed on September 5, 2006. Enclosed is the Preliminary International Report in regard to Patentability in English.

Respectfully submitted,

FAY, SHARPE, FAGAN,
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11/14/06
Date

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CERTIFICATE OF MAILING OR TRANSMISSION	
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Translation

Preliminary International Report in regard to Patentability (Appended Page)
- International File Reference PCT/EP2005/002330

Determination

1. Reference is made to the following documents:
   D1: D1a:WO 03/053711 A & D1b: EP 1 466 753 A
   D2: US 6 497 926 B1
   D3: US 2002/066404 A1

2.1 The present application fails to satisfy the requirements of Article 33(1) PCT because the subject of Claims 1-3, 15-18 and 23-25 is not new according to the meaning of Article 33(2) PCT.

Document D1 (section 0199 – 0205) discloses a method for the manufacture of a thermal paper comprising a carrier substrate, an intermediary pigment layer (primer layer) a thermal reaction layer, with the intermediary pigment layer being formed via the curtain-coating method with an aqueous application suspension containing pigments and binding agents, whereby an aqueous application suspension is applied by means of the curtain-coating method containing calcined kaolin having a particle size from 0.1 to 10 µm, and solid matter contents of approximately 25 to 75 % by weight, at an operating speed of at least approximately 500 m/min (2000 is specifically indicated, see section 0226), with application weight of the aqueous application suspension containing the calcined kaolin being adjusted to approximately 30 g/m^2 relative to the dry substance and on the intermediary pigment layer simultaneously being formed and dried on-line, or in a separate spreader process off-line, a thermal reaction layer by means of the curtain-coating method or by means of a roller application method or by means of a spread – coating method or by means of an air brush method.

additional specifications to the newly added characteristics:

- the particle size of the kaolin in the intermediary layer is not disclosed in D1, this large range includes, however, the normal range for kaolin particles of 0.4-2 µm., see roempp online (kaolin) for example.

- "curtain coating" is preferred, see D1, page 20, line 57.
- application weight is 7-12 g/m^2, see D1, page 20, lines 43-44. It does not matter whether it is dry or wet, inasmuch as in both instances a weight results of less than 30g/m^2 dry substance.

- it is not clear what other alternatives remain, from what can be learned from the present Claim 1: "either simultaneously, i.e. online or in a separate spreader process". Therefore, this characteristic does not seem to be defined vis-à-vis D1 or the other documents. It seems that the documents must definitely describe at least one of these methods.
Therefore, D1 indicates all characteristics of the present Claim 1.

In regard to D2 and D3:

2.2 The present application fails to satisfy the requirements of Article 33(1) PCT because the subject of Claim 1 is not based on inventive activity according to the meaning of Article 33(3) PCT.

2.2.1 Document D2 is considered as the most proximate state of the art vis-à-vis the subject of Claim 1. It discloses (the citations in brackets refer to this document):
A method for the manufacture of a thermal paper with (see e.g. example 1) a carrier substrate, an intermediate pigment layer (in D2 undercoat layer) with calcined kaolin, binding agents and additional application additives and a thermal reaction layer. The solid matter contents in example 1 in D2 is 40%. Both layers are applied at high speed by curtain-coating method (see column 1, line 62 – column 2 line 10) which is also part of the object in D2. For the reasons mentioned above, it is assumed that the kaolin, Ansilex by Messrs. Engelhard, also lies within the range of 0,1 – 10 µm. Application weight is 8g/m^2 (solid matter) (see D2, column 15, line 15). The thermal reaction layer (B) appears to be formed simultaneously online with the intermediate layer (A) by curtain coating, see column 15, line 5-17. In this context, reference is made again to the ambiguity of the last five lines of the present claim.

2.2.2 The subject of Claim 1 therefore differs from that known from D2 in that the high speed is specifically defined as at least 500m/min.

2.2.3 The object to be solved with the present invention can thus be regarded in that one selects a range for high coating speed.

2.2.4 The proposed solution suggested in Claim 1 of the present application cannot be considered as being inventive for the following reasons (Article 33(3) PCT):
D3, for example suggests a curtain-coating apparatus and a method for manufacture of thermal papers wherein an aqueous pigment dispersion having a solid matter contents of up to 70% is applied with an operating speed of up to 3000 m/min (see Claims 1, 9 and 21 in D3).

2.2.5 Therefore a person skilled in the art would, without any inventive addition, combine all characteristics disclosed in D2 and D3, in order to solve the assigned object. The solution proposed in the independent claim 1 can therefore not be regarded as inventive (Article 33(3) PCT).

3. Dependent Claims 2 – 26

The Claims 2 – 26 do not contain any characteristics which in combination with the characteristics of any claim to which they relate, satisfy the requirements of the PCT in regard to novelty and/or inventive activity. The additional properties of Claims 2, 3 (see section [0228], 4 (see section [0219], 5 (see section [0222[), 6, 7, (see sections [0196-0198]), 8, 9, 10 (see normal value for kaolin particles, i.e. implicit), 11 (see section [0203]),12 (see section [0201]), 13, 14-18, 23-25 are described in D1. The additional properties of Claims 14, 19-22 and 26 are described in D2 or D3 or seem to produce no unexpected effects and can therefore not be regarded as inventive since this lies within the scope of what a person skilled in the art would do.

Paper Factory August Koehler AG
Our Ref.: PAT 434/66-05-PCT

Munich, September 22, 2005
Dr.H/hg(sw)

New Claims 1 to 26

1. Method for the manufacture of a thermal paper with a carrier substrate, an intermediate pigment layer, a thermal reaction layer and, optionally, one or several additional intermediate and/or top layers, wherein the intermediary pigment layer is formed by an aqueous application suspension containing pigments, binding agents and, optionally, additional application additives by means of the curtain coating method, characterized in that an aqueous application suspension containing calcined kaolin having a particle size of approximately 0.1 to 10 µm, with solid matter contents of approximately 25 to 75% by weight is applied by means of the curtain coating method at an operating speed of at least approximately 500 m/min, wherein the application weight of the aqueous application suspension containing the calcined kaolin is adjusted to approximately 30 g/m^2 relative to the dry substance, and on the intermediate pigment layer or intermediate pigment layers simultaneously on-line or in a separate spreader process off-line, a thermal reaction layer is formed and dried by means of the curtain-coating method or by means of a roller application method or by means of a spread-coating method or by means of an air-meter coating method.

2. Method according to Claim 1, characterized in that the solid matter contents of the application suspension lies between approximately 35 and 60% by weight.

3. Method according to Claim 1 or 2, characterized in that the drop height of the aqueous suspension containing the calcined kaolin is adjusted during the execution of the curtain-coating method to approximately 5 to 35 cm, in particular to approximately 8 to 20 cm.

4. Method according to one of Claims 1 to 3, characterized in that the application suspension containing the calcined kaolin is adjusted to a viscosity of approximately 150 to 1500 mPas (Brookfield, 100 R/min, 25°C), in particular approximately 250 to 900 mPas.

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5. Method according to one of Claims 1 to 4, characterized in that the surface tension of the application suspension containing the calcined kaolin is adjusted to approximately 23 to 60 mN/m, in particular to approximately 27 to 40 mN/m (static ring method according to DuNoüy).

6. Method according to one of Claims 1 to 5, characterized in that as carrier substrate use is made of conventional carrier paper, synthetic carrier paper and/or a plastic foil, wherein the paper carrier specifically presents a basis weight of approximately 40 to 120 g/m^2.

7. Method according to Claim 6, characterized in that the paper carrier contains for stabilization of dimension synthetic fibers in addition to natural cellulose fibers, wherein the long fiber percentage amounts to approximately 40% by weight, in particular to approximately 5 to 40% by weight and the short fiber percentage approximately 60 to 95% by weight, in particular approximately 60 to 80% by weight.

8. Method according to at least one of the preceding Claims, characterized in that in the application suspension containing the calcined kaolin are incorporated usual additives in the form of processing aids, in particular in the form of surface-active substances, retention adjuvants and/or rheological adjuvants.

9. Method according to Claim 8, characterized in that the surface-active substances are employed in form of C_2-C_{12}-dialkylsulfo-succinate-alkali salts or siloxanes, the retention means in form of carboxy-methyl-celluloses or polyacrylamides and/or the rheology means in form of higher molecular, water soluble starch derivatives carboxymethyl-celluloses, sodium alginates, polyvinyl-alcohols or poly(meth)acrylates.

10. Method according to at least one of the preceding Claims, characterized in that the calcine kaolin of the aqueous application suspension presents a particle size of approximately 0.1 to 2 µm.

11. Method according to at least one of the preceding Claims, characterized in that the aqueous application suspension containing calcined kaolin contains a binding agent in the form of water-soluble starches, starch derivatives, hydroxyl-ethyl-celluloses, polyvinyl-alcohols, modified polyvinyl-alcohols, sodium-polyacrylates, acrylamide-(meth)acrylate-co-polymers, acrylamide-acrylate-methacrylate-terpolymers, alkali salts of styrene-maleic anhydride-co-polymers, alkali salts of ethylene-maleic anhydride-co-polymers and/or lattices such as poly-acrylate, styrene-butadien-co-polymers, polyurethanes, acrylate-butadien-co-polymers, polyvinyl-acetate and/or acryl-nitril-butadien-co-polymers.

12. Method according to at least one of the preceding Claims, characterized in that the application weight of the aqueous application suspension containing the calcined kaolin is adjusted to up to approximately 25 g/m^2, relative to dry substance.

13. Method according to Claim 12, characterized in that the application weight of the application suspension containing the calcined kaolin is adjusted to approximately 2 to 20 g/m^2 relative to dry substances, in particular to approximately 4 to 8 g/m^2.

14. Method according to at least one of the preceding Claims, characterized in that on the intermediary pigment layer, if appropriate after drying, is/are formed one or several additional intermediary pigment layers by means of the curtain-coating method.

15. Method according to claim 14, characterized in that into the aqueous application suspension utilized for forming the thermal reaction layer are incorporated color developers, color formers, sensitizing melt auxiliaries, anti-aging means, binding agents and customary additives, such as in particular slip additives, rheological auxiliaries, optical brighteners and/or fluorescent substances.

16. Method according to one of Claims 14 to 15, characterized in that the drop height of the aqueous application suspension for the formation of the thermal reaction coat is adjusted to approximately 5 to 35 cm during execution of the curtain-coating method, in particular to approximately 8 to 20 cm.

modified page

17. Method according to at least one of Claims 14 to 16, characterized in that the application suspension for the formation of the thermal reaction layer is adjusted to a viscosity of approximately 150 to 1500 mPas (Brookfield, 110 R/min, 25° C) in particular to approximately 250 to 900 mPas.

18. Method according to at least one of Claims 14 to 17, characterized in that the surface tension of the application suspension for the formation of the thermal reaction layer is adjusted to approximately 23 to 60 mN/m, in particular to approximately 30 to 40 mN/m (statical ring method according to Du Noüy).

19. Method according to at least one of Claims 14 to 18, characterized in that the dried thermal reaction layer is adjusted using customary smoothing means to a Bekk smoothness of approximately 100 to 1200 s, in particular of approximately 300 to 700 s, measured according to DIN 53101.

20. Method according to at least one of Claims 14 to19, characterized in that the aqueous application suspension utilized for the formation of the thermal reaction coat contains, in addition, further pigments.

21. Method according to Claim 20, characterized in that the pigments represent inorganic extender pigments, in particular clays, magnesium carbonates, sodium aluminum silicates, aluminum oxides, aluminum silicate, silicic acid, siliceous earth, magnesium silicates, titanium dioxides, calcium carbonates of synthetic as well as natural origin.

22. Method according to Claim 21, characterized in that the extender pigments have an average particle size of approximately 0,1 to 10 µm, in particular approximately 0,1 to 2 µm.

23. Method according to at least one of Claims 14 to 22, characterized in that on the thermal reaction layer are formed additional layers, on-line or off-line, as protective layer and/or as print-enhancing layer.

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24. Method according to at least one of the preceding Claims, characterized in that the curtain-coating method is operated at a speed in excess of 750 m/min.

25. Method according to Claim 24, characterized in that the curtain-coating method is operated at a speed of at least 1000 m/min, in particular of at least approximately 1500 m/min.

26. Method according to at least one of the preceding Claims, characterized in that the open exit gap width of the curtain spreader head during the curtain coating method is adjusted to approximately 0.1 to 1 mm, in particular to approximately 0.2 to 0.6 mm and/or the nozzle through-puts for the respective application suspension to approximately 0.3 to 15.1 cm^3 (cm working width x s), in particular to approximately 0.5 to 5.0 cm^3/(cm x s), wherein the curtain spreader head is adjustable to single- or multiple gap.

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